HMC205

GaAs MMIC PASSIVE FREQUENCY DOUBLER, 6 - 12 GHz INPUT

Typical Applications

The HMC205 is suitable for:

- Wireless Local Loop
- LMDS, VSAT, and Pt to Pt Radios
- Test Equipment

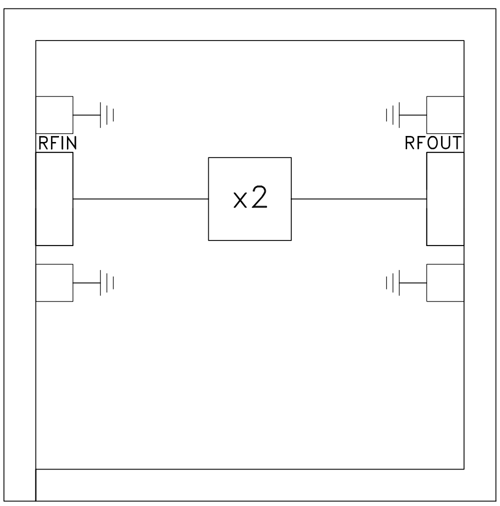
Features

Conversion Loss: 12 to 17 dB

Fo, 3Fo, 4Fo Isolation: 32 dB

Passive: No Bias Required

Functional Diagram



General Description

The HMC205 is a passive miniature frequency doubler in a MMIC die. Suppression of undesired fundamental and higher order harmonics is 32 dB typical with respect to input signal level. The doubler utilizes the same GaAs Schottky diode/balun technology found in Hittite MMIC mixers. It features small size, no DC bias, and no measurable additive phase noise onto the multiplied signal.

Electrical Specifications, T_A = +25° C, As a Function of Drive Level

	Input = +10 dBm			Input = +12 dBm			Input = +15 dBm			
Parameter	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Units
Frequency Range, Input		7.0 - 12.0			6.0 - 12.0			6.0 - 12.0		GHz
Frequency Range, Output		14.0 - 24.0			12.0 - 24.0			12.0 - 24.0		GHz
Conversion Loss		18	21		17	20		15	18	dB
FO Isolation (with respect to input level)				28	32					dB
3FO Isolation (with respect to input level)				36	40					dB
4FO Isolation (with respect to input level)				26	32					dB

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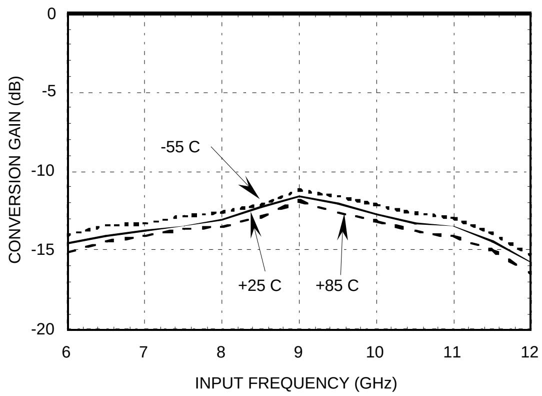
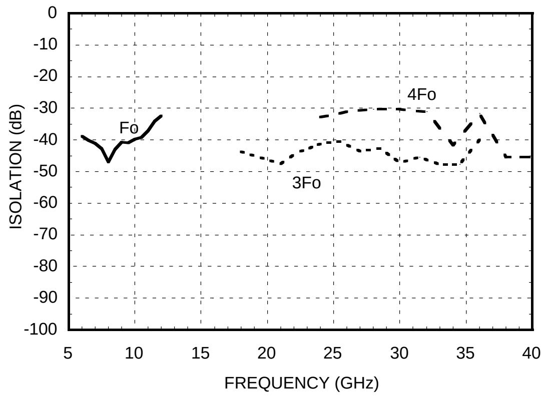
Conversion Gain vs Temperature @ +15 dBm Drive Level

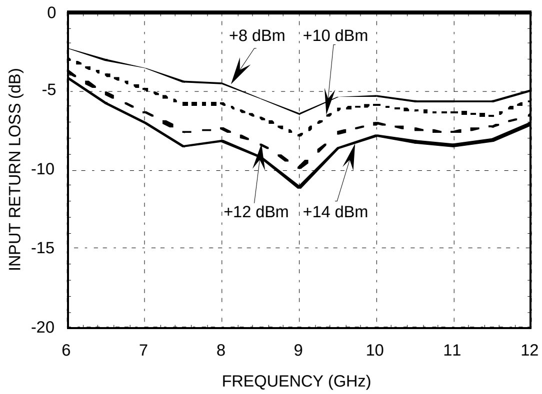


Isolation @ +15 dBm Drive Level*

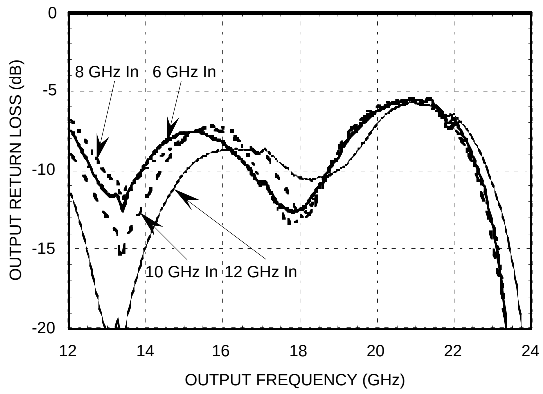


*With respect to input level

Input Return Loss vs. Drive Level



Output Return Loss for Several Input Frequencies



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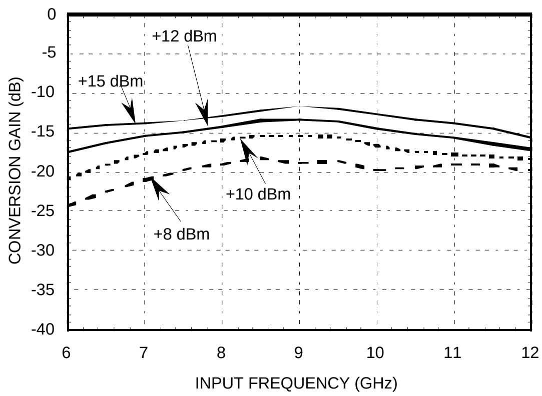
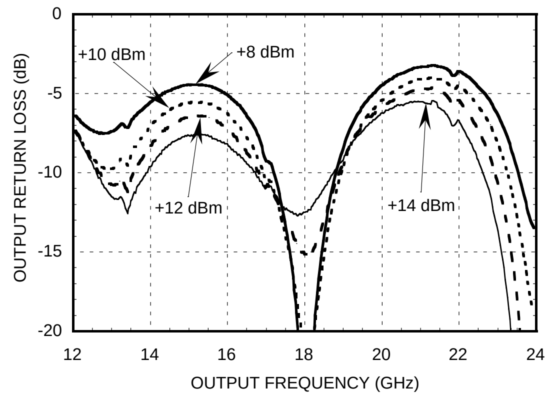
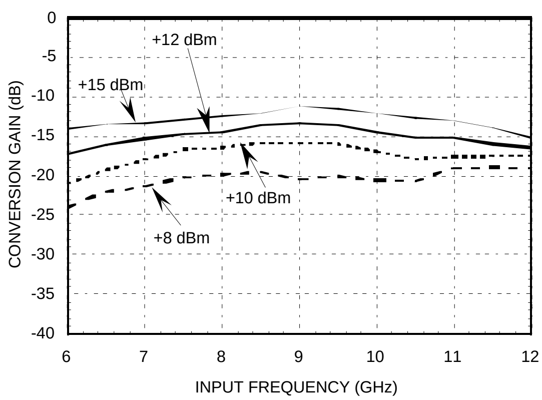
Conversion Gain @ 25°C vs. Drive Level



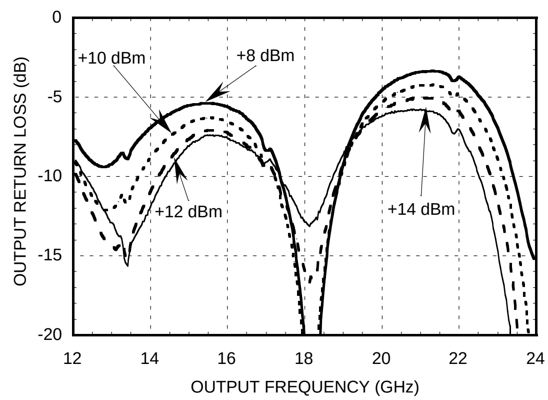
Output Return Loss with 6 GHz Input



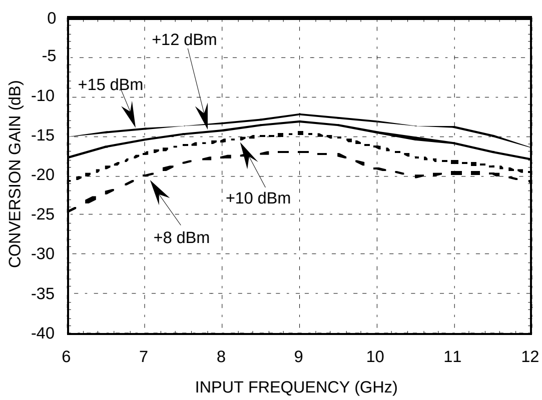
Conversion Gain @ -55°C vs. Drive Level



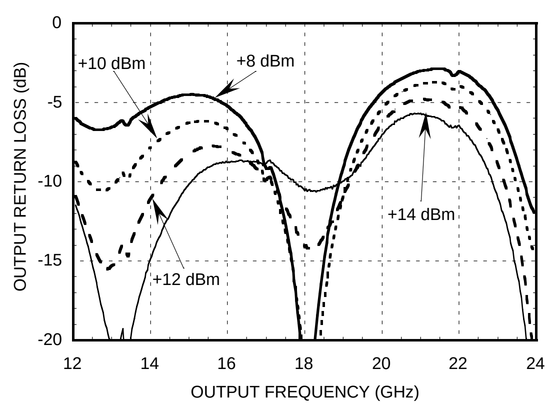
Output Return Loss with 10 GHz Input



Conversion Gain @ +85°C vs. Drive Level



Output Return Loss with 12 GHz Input



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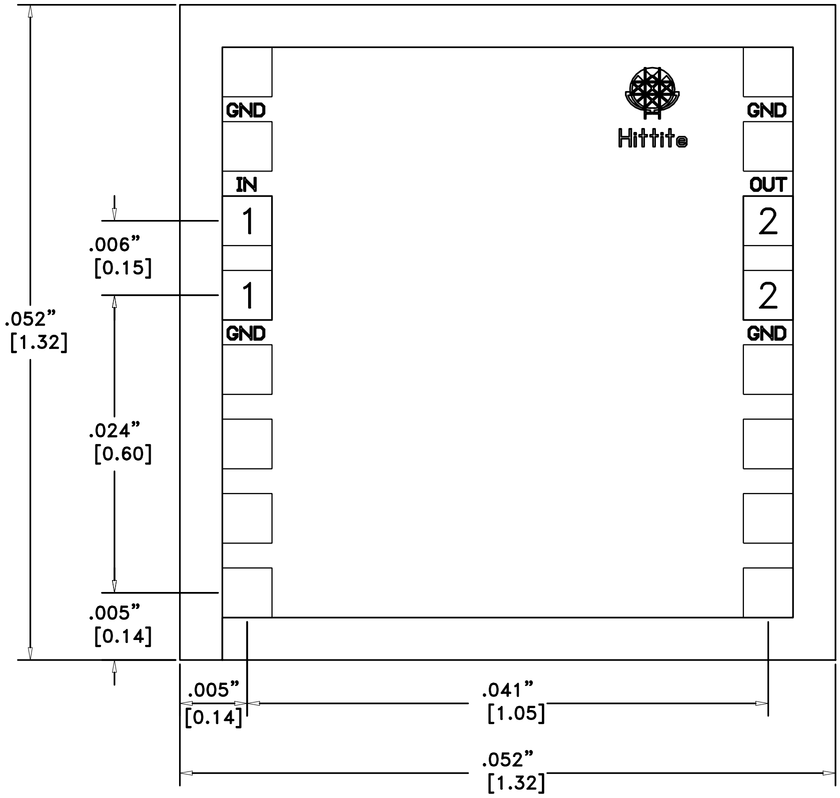
Absolute Maximum Ratings

Input Drive	+27 dBm
Storage Temperature	-65 to +150 °C
Operating Temperature	-55 to +85 °C

Outline Drawing



NOTES:
1. ALL DIMENSIONS ARE IN INCHES [MM]
2. BOND PADS ARE .004” SQUARE
3. TYPICAL BOND PAD SPACING CENTER TO CENTER IS .006” EXCEPT AS SHOWN.
4. BACKSIDE METALLIZATION: GOLD
5. BACKSIDE METAL IS GROUND.
6. BOND PAD METALLIZATION: GOLD

Handling Precautions

Follow these precautions to avoid permanent damage.

Cleanliness: Handle the chips in a clean environment. DO NOT attempt to clean the chip using liquid cleaning systems.

Static Sensitivity: Follow ESD precautions to protect against > ± 250V ESD strikes.

Transients: Suppress instrument and bias supply transients while bias is applied. Use shielded signal and bias cables to minimize inductive pick-up.

General Handling: Handle the chip along the edges with a vacuum collet or with a sharp pair of bent tweezers. The surface of the chip has fragile air bridges and should not be touched with vacuum collet, tweezers, or fingers.

Mounting

The chip is back-metallized and can be die mounted with AuSn eutectic preforms or with electrically conductive epoxy. The mounting surface should be clean and flat.

Epoxy Die Attach:
Apply a minimum amount of epoxy to the mounting surface so that a thin epoxy fillet is observed around the perimeter of the chip once it is placed into position.

Cure epoxy per the manufacturer's schedule.

Wire Bonding

Ball or wedge bond with 1.0 diameter pure gold wire. Thermosonic wirebonding wiht a nominal stage temperature of 150 °C and a ball bonding force of 40 to 50 grams or wedge bonding force of 18 to 22 grams is recommended. Use the minimum level of ultrasonic energry to achieve reliable wirebonds. Wirebonds should be started on the chip and terminated on the package. RF bonds should be as short as possible.

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Notes: